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Interactive comment on “PM₁₀ measurements in urban settlements after lava fountain episodes at Mt Etna, Italy: pilot test to assess volcanic ash hazard on human health” by D. Andronico and P. Del Carlo

Anonymous Referee #1

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GENERAL COMMENTS The manuscript by Andronico and Del Carlo deals with the problem of “thoracic” ash (P10) at Etna volcano, at two different times following a lava fountain event. The manuscript is clear and concise, and written in a plain English. The topic is important and of sure interest for an international journal. Despite all these facts, however the presented data appear insufficient to sustain some of the conclusions presented by the authors. In particular, the rationale for data collection should be planned more accurately and adapted to the main topics of the discussion. Some of the data presented (grain size, morphology of the ash material) are not sufficiently dis-

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cussed, and should be implemented with some additional analyses in order to reinforce the proposed conclusions.

SPECIFIC COMMENTS - data were collected at three different sites immediately following, and 1 month after, the eruption. As stated by the Authors, all the measured concentrations of PM 10 so clearly refer to problems of ash resuspension. Unfortunately, data are in some cases of difficult interpretation due to a biased measurement set up. In fact, the measures at the three sites were collected at three different distances from the ground (from 40 to 100 cm), making them poorly comparable in the absence of a clear, data-based discussion about the possible development of a vertical gradient in the ash concentration. - no data on wind velocity is given, and data on road traffic very scarce; these data are essential, especially if the authors want to demonstrate the prevalence of the latter factor on ash remobilization. Also, the distance from the road should be clearly indicated. I suppose that, in the case of a very localized factor of remobilization like road traffic, large vertical and horizontal gradients in the ash concentration are expected; - authors suggest that PM10 is mainly related to secondary ash production by grinding of the scoria related to intense traffic. The presented data on ash morphology could help in defining this, but they are not sufficiently expanded and discussed, in order to bring a real improvement of the general understanding of the problem. As an example, it could be useful to have data on clast roundness compared with the roundness of the primary products, before being intensely remobilized.

- grain size analyses are only partially exhaustive for two reasons: i) they are only partial, as data stop at phi 5 (no data on PM10 are given); ii) data on material directly sampled from the road (so experiencing grinding by vehicular traffic) should be given, in order to document the increase of the finer-grained fractions;

To face all these problems, I so suggest a thorough rethinking of the manuscript, with the addition of new data. In particular, in the collection of new data, a suited strategy should be planned, trying to measure both vertical and horizontal gradients in ash concentration at each site. In this case, a general picture of the distribution of PM10

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concentration could be given, and discussion and conclusions would be largely supported by the data

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